



*Did you know?:*

## **Advanced Lightweight Rainfall Radiometer Enjoys Successful Test Flights, Demonstrates Key Benefits for Future Space-based Missions**

A new, lightweight passive microwave radiometer instrument developed jointly by NASA Goddard Space Flight Center and the University of Michigan successfully performed six calibration and science validation flights on board NASA's DC-8 aircraft. A recent graduate of the NASA Earth-Sun System Technology Office (ESTO), the Lightweight Rainfall Radiometer (LRR) produced high-quality science data during one of the 6-hour flights (in tandem with the JPL PR-2 airborne radar instrument) over a storm system near Vancouver, WA.

The X-band LRR, which is suitable for aircraft or space-based platforms, enables markedly improved measurement of precipitation drop size and distribution (at 10.7 GHz), as well as rain rate and surface wind speeds, when used in conjunction with other instruments, such as the PR-2. With a receiver less than 1/8th the size and using 50% less power than predecessors, the LRR could lead to a space-borne 25 channel synthetic aperture radiometer that would not be strictly limited by size and power requirements.



The core technology of the LRR – a synthetically thinned aperture radiometer (STAR) – demonstrated the feasibility of a one-dimensional geometric interferometer (no moving parts) for future NASA X-band missions. The lack of a mechanical scanning apparatus found on traditional radiometers makes the LRR payload smaller, lighter, and cheaper to launch while also reducing the complexity and risk of the instrument. The team also conducted an antenna design study that validated the STAR technology in the critical Ku- and Ka-bands.

Technical contributions came from the Center for Advanced Microelectronics and Biology Research (CAMBR) at the University of Idaho, Northrop Grumman Space Technology, the University of Massachusetts, and NASA Dryden Flight Research Center. The task generated 17 publications and four graduate-level theses.

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